**CHAPTER 6: PRESSURE IN FLUIDS**

**DEFINE: Copy and define the key terms found on page 192 of your textbook.**

**A FORMULA FOR PRESSURE: Pressure is a measure of force divided by the unit area on which it is exerted. The unit for pressure is N/m.**

**Pressure (P)= FORCE(F) P= F**

**AREA(A) A**

**PRESSURE AND THE PARTICLE THEORY: The particle theory states that the particles in a solid, liquid or gas are always in motion. Particles move quickly if they have a lot of energy and more slowly if they have less energy.**

**Even though the particles in fluids are always moving, a liquid or gas that is contained seems to be at rest. The particles exert force in the direction of their motion, and since they move in every direction, almost all the forces cancel each other out. The particles whose force is not cancelled exert a force on the walls of the container, and the particles of the container exert a force on the particles of fluid. These forces are equal.**

**When the container for a fluid has a crack or hole, the fluid flows out through the opening because the particles exert force equally in every direction. For example, when a tire has been punctured, the air flows out of the tire, never into the tire.**

**COMPRESSIBILITY: The particles of a fluid push against each other until they encounter a force in the opposite direction, such as the walls of their container. In a gas, there a relatively large spaces between the particles, so the particles of gas can be compressed. When they are compressed, the particles move closer together.**

**There is not as much space between the particles of a liquid or solid, so their particles cannot be compressed to fit into a smaller volume.**

**UNDER PRESSURE: Gases can be compressed, making it possible to store them in smaller volumes for future use. When a gas is released from a compressed state, the particles that have been squeezed close together are ready to move away from each other quickly.**

**Gas forced into a compressed state will search for an opportunity to escape, so that a very small hole can be an escape route.**

**PRESSURE CHANGES WITH DEPTH: The force of gravity pulls matter closer to the centre of Earth. This force acts on all particles. At any specific altitude or depth, particles exert pressure. Additional pressure is added to this by all the particles above them. These particles are being pulled toward the centre of the Earth.**

**Flow pressure is exerted by a fluid in motion. It can be moving on its own in order to equalize pressure, or it can be forced into an area by other pressures.**

**Static pressure is exerted by a fluid that is not in motion, the fluid is at rest – it is not travelling from one place to another. A fluid that is contained exerts static pressure on the walls of its container and any objects within the container.**

**The pressure increases as you go deeper underwater. This occurs because the gravity is pulling on all particles above you. Similarly, as you climb higher, the air pressure will generally decrease because there are fewer air particles in the atmosphere as the altitude increases.**

**PRESSURE AND TEMPERATURE: According to the particle theory, when particles are heated, they move faster and when particles are cooled, they move more slowly.**

**WATER PRESSURE AND HYDRAULIC SYSTEMS**

**A fluid at rest exerts pressure equally in all directions, perpendicular to (90 against) the walls of its container. The particles in a closed container or tube exert this pressure equally in all directions, and if pressure is applied to the liquid, the pressure is transmitted through the liquid.**

**HYDRAULIC SYSTEMS: a hydraulic system uses the incompressibility of liquids to transmit an applied force along an enclosed liquid to make something else in the system move.**